

WHAT IS CLAIMED IS:

1. A probe carrier comprising a probe immobilized area where a nucleic acid probe is immobilized on a carrier, wherein
5 the carrier has a phosphorus-containing area that contains phosphorus in a predetermined concentration, and the phosphorus contained in the phosphorus-containing area is used as a standard for quantitative analysis of the nucleic acid probe by
10 detecting the phosphorus of the nucleic acid probe.
2. A probe carrier according to claim 1, wherein a plurality of probe immobilized areas are each arranged independently on the carrier in a
15 matrix form.
3. A probe carrier according to claim 1, wherein the phosphorus-containing area is formed by implanting the phosphorus into at least a portion of
20 the carrier.
4. A probe carrier according to claim 1, wherein the phosphorus-containing area is formed as a film formed on at least a portion of a surface of the
25 carrier.
5. A probe carrier according to claim 4,

wherein a concentration of the phosphorus in the film is fixed in a depth direction.

6. A probe carrier according to claim 1,
5 wherein the phosphorus-containing area is formed by incorporating the phosphorus in an entire portion forming the surface having the probe immobilized area of the carrier.

10 7. A probe carrier according to claim 6, wherein the carrier constitutes the surface having the probe immobilized areas and the entire carrier is comprised of a substrate which uniformly contains the phosphorus.

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8. A probe carrier according to claim 7, wherein the carrier is composed of a glass substrate.

9. A probe carrier according to claim 6,
20 wherein a content (weight ratio) of the phosphorus in the phosphorus-containing area is 0.1 ppm or more and 10 % or less.

10. A probe carrier according to claim 5,
25 wherein the film is made from phosphorus silicate glass (PSG) or boron phosphorus silicate glass (BPSG).

11. A probe carrier according to any one of
claims 1 to 10, wherein the nucleic acid probe has a
nucleic acid that is at least one selected from the
group consisting of DNA, RNA, peptide nucleic acid
5 (PNA), complementary DNA (cDNA) and complementary RNA
(cRNA).

12. A probe carrier according to claim 1,
wherein quantitative analysis of the phosphorus is
10 carried out by detecting a phosphorus secondary ion
by time-of-flight secondary ion mass spectrometry
(TOF-SIMS).

13. A method for analyzing a probe carrier
15 having a probe immobilized area in which a nucleic
acid probe is immobilized and a phosphorus-containing
area that contains phosphorus in a predetermined
concentration on a carrier, comprising:

detecting an amount of the phosphorus contained
20 in the nucleic acid probe in the probe immobilized
area as a first signal intensity;

detecting an amount of the phosphorus in the
phosphorus-containing area as a second signal
intensity; and

25 determining the nucleic acid probe in the probe
immobilized area by standardizing the first signal
intensity by using the predetermined concentration of

the phosphorus in the phosphorus-containing area and the second signal intensity.

14. A method for analyzing a probe carrier
5 according to claim 13, wherein the plurality of probes immobilized areas is each arranged independently on the carrier in a matrix form.

15. A method for analyzing a probe carrier
10 according to claim 13, wherein the phosphorus-containing area is formed by implanting the phosphorus into at least a portion of the carrier.

16. A method for analyzing a probe carrier
15 according to claim 15, wherein the phosphorus-containing area is formed as a film formed on at least a portion of a surface of the carrier.

17. A method for analyzing a probe carrier
20 according to claim 16, wherein a concentration of the phosphorus in the film is fixed in a depth direction.

18. A method for analyzing a probe carrier
according to claim 13, wherein the phosphorus-
25 containing area is formed by containing the phosphorus in an entire portion forming the surface having the probe immobilized area of the carrier.

19. A method for analyzing a probe carrier
according to claim 18, wherein the carrier
constitutes the surface having the probe immobilized
areas and the entire carrier is composed of a
5 substrate which uniformly contains the phosphorus.

20. A method for analyzing a probe carrier
according to claim 19, wherein the carrier is
composed of a glass substrate.

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21. A method for analyzing a probe carrier
according to claim 18, wherein a content (weight
ratio) of the phosphorus in the phosphorus-containing
area is 0.1 ppm or more and 10 % or less.

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22. A method for analyzing a probe carrier
according to claim 16, wherein the film is made from
phosphorus silicate glass (PSG) or boron phosphorus
silicate glass (BPSG).

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23. A method for analyzing a probe carrier
according to claim 13, wherein the nucleic acid probe
has a nucleic acid that is at least one selected from
the group consisting of DNA, RNA, peptide nucleic
25 acid (PNA), complementary DNA (cDNA), and
complementary RNA (cRNA).

24. A method for analyzing a probe carrier according to claim 17, wherein the phosphorus concentration of another film which is formed under the same condition as the film which contains the
5 phosphorus and has the fixed phosphorus concentration in the depth direction is analyzed by at least one analysis method selected from the group consisting of:

- 1) secondary ion mass spectrometry: SIMS;
- 10 2) time-of-flight secondary ion mass spectrometry (TOF-SIMS);
- 3) X-ray photoelectron spectroscopy: XPS;
- 4) Auger electron spectroscopy: AES;
- 5) inductively coupled plasma atomic emission
15 spectroscopy: ICP-AES;
- 6) inductively coupled plasma mass spectrometry: ICP-MS; and
- 7) Fourier transforms infrared spectroscopy: FT-IR, and determined based on an analytical result thereof.

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25. A method for analyzing a probe carrier according to claim 13, wherein the first signal intensity and the second signal intensity each comprise a secondary ion intensity detected by time-
25 of-flight secondary ion mass spectrometry (TOF-SIMS).

26. A method for analyzing a probe carrier

according to claim 25, wherein the secondary ion is one selected from the group consisting of P^- , PO^- , PO_2^- and PO_3^- .

5 27. A method for analyzing a probe carrier according to claim 16, wherein the signal intensity detected from the film is a signal intensity obtained after the area is etched by sputtering in a fixed amount.

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 28. A method for analyzing a probe carrier according to claim 13, wherein an image of an arrangement of the nucleic acid probe immobilized areas can be quantitatively displayed.

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